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Examining Cognitive Structures of Prospective Preschool Teachers Concerning the Subject "Force and Motion"*

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Abstract

The purpose of this study is to identify the cognitive structures of prospective preschool teachers concerning the concepts included in the subject "force and motion". The study was conducted on a total of 56 prospective teachers who studied Preschool Teaching at Canakkale Onsekiz Mart University. The Word Association Test (WAT) was employed to reveal their cognitive structures. In addition, each participant was asked to build up a sentence with each keyword, which, in turn, enabled their misconceptions and conceptual change processes to be disclosed. The WAT included 10 keywords related to the subject "force and motion". Arranged to evaluate the results of the WAT, the frequency table presented the number of times each answer was repeated. A conceptual network was formed on the basis of the frequency table. The network was created through the technique "cut-off point" in order to reveal the conceptual changes in a decisive manner. It was found that the prospective teachers had misconceptions about such concepts as mass, weight, velocity, acceleration, frictional force and gravitational force, and that they had built up non-scientific sentences. It was concluded that the prospective teachers had not been able to internalize the subject "force and motion".

Key Words

Prospective Preschool Teachers, Cognitive Structure, Word Association, Misconceptions.

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Science education enables individuals to know what is happening in their environment and nature, to comprehend relationships, to observe things, to interpret information and to acquire scientific process skills (Hamurcu, 2003). One of the main objectives of science education is to provide individuals with the ability not to memorize information they learn at all educational stages, starting from primary school, but to integrate this information with situations they experience in later stages of their life (Bilgin & Geban, 2004; Demirbaş & Yağbasan, 2006). Therefore, in order to learn scientific subjects included in the curriculum in a proper way, students need to internalize and develop a positive attitude towards them (Erdemir & Bakırcı, 2009). Science education can be made efficient only if sufficient importance is attached to it starting from primary education. In the early 1960s, Jean Piaget's studies led to an increase in the interest in

science teaching for preschool and primary school students. It is a known fact that information that students acquire especially during their preschool years is more permanent and provides a basis for future learning (Küçükturan, Özturk, & Cihangir, 2000). Especially during their preschool years, children are open to learning thanks to their sense of wonder and tend to learn things by using all their senses. They observe what is going on in the outside world and start forming their own hypotheses and using their own science/scientific processes (Karamustafaoğlu & Üstün, 2006; Özbey & Alisinanoğlu, 2010; Özdemir & Uzun, 2006; Ünal & Akman, 2006). Children begin acquiring scientific concepts during their preschool years. Most of these desired concepts are taught through various activities (Ayvacı, 2010; Özbey & Alisinanoğlu). All things considered, it is essential that attempts should be made to reveal the cognitive structures and existing misconceptions of third grade prospective preschool teachers concerning the subject "force and motion".

The reason why the study was conducted on third grade students is that students of preschool teaching take the course "Science Education" in their third years. It is essential that children should be supported to have a positive attitude towards science and every single question raised by them should be meticulously discussed and answered. The reason for this is that teachers with interest in and passion for science and reasoning qualities are likely to be a positive role model for children. Teachers should be able to attract children to all kinds of scientific activities and exercises. Thus, teachers need to know children and their mental developmental level, to organize activities with a consideration into individual differences, to arouse their interest in science, to enable them to develop a reasoning attitude towards situations, to attend to their creative scientific thoughts and to establish an efficient learning environment (Günay Bilaloğlu, Aslan, & Aktaş Arnas, 2008; Karamustafaoğlu & Üstün, 2006; Ünal & Akman, 2006). The prospective teachers to be included in the sample had to satisfy a criterion, namely having taken the course "Science Education". This is the only science-related course in the curriculum for Preschool Teaching. Students of preschool teaching are thought "Science Education" in their third year for four hours a week (two theoretical hours and another two hours for practical issues). The study was carried out after the prospective teachers had taken the course.

The Word Association Test, Cognitive Structures and Misconceptions

Word association is an alternative testing and evaluation instrument that enables one to reveal cognitive structures of students, to present the ties between the concepts (information network) included in these structures, and to test whether the relationships between the concepts in long term memory are sufficient or significant (Bahar, Nartgün, Durmuş, & Bıçak, 2006). Word association tests are generally used in psychology and science education. Until recently, the use of word association tests was confined to group comparisons (Roger, Antonia, & Cachapuz, 1989).

The word association test is classified as a projective technique. Projective techniques are generally used when participants are expected to provide answers to open-ended questions. Furthermore, most of these techniques provide flexibility for the number of answers that can be given by participants (Lilienfeld, Wood, & Garb, 2000). It is Carl Jung who is credited with developing word association tests. According to him, thoughts, emotions, experiences and perceptions are organized around a theme center. These word associations are related to the studies of that person (Booree, 1977). A typical word association test requires participants to write down the first words that spring to mind concerning a keyword (Wettler & Rapp, 1996).

Word association is a powerful research technique proposed by Galton (1980) and developed by Carl Gustav Jung for conceptual systems of human beings. Galton studied the relationship between one's IQ and his/her word association, but could not find a significant correlation between the two. On the other hand, Carl Jung studied how human beings associate their views, emotions, experiences and information. To him, views and experiences are associated and grouped with each other. Carl Jung named these groupings "complexes".

Word association is also known as associative experiment. Word association is a test that is based on a list of words and requires respondents to list the first words that spring to mind. This research technique has a long history and has been in use for more than a century (cited in Kostova & Radoynovska, 2008).

Word association comes in many types depending on its structure. In controlled word association test, answers are deliberately made difficult in terms of category, word type and concepts. On the other hand, free word association test is not confined to a

particular category or word type. In discontinuous word association test, all participants are expected to provide a common answer to each word (Dollinger et al., 1991). In continuous word association test, the same keyword is introduced many times in order to stimulate the respondent to some extent. Once keywords have been introduced to respondents, they are asked to write down a number of common words about these words within a given time. This is why such tests are called continuous tests. When keywords are presented in a list many times, it is called sequential test. It has been proven that word association tests are suitable for problem solving (cited in Kostova & Radoynovska, 2008).

Word association tests can be used to collect information from people about what they like and dislike. They are suitable for disclosing a general idea about scientific concepts. In addition, they provide the opportunity for conceptual information organization in the treatment of people with certain psychological problems, in the visualization of conceptual relationships, in the use of concept maps, in the production of proper messages for market research and in the determination of students' anxiety levels for different classroom activities (Colgan & McGuinness, 1998).

Cognitive structure is a hypothetical structure that indicates the concepts and the degree of the relationships between the concepts in long term memory (Shavelson, 1974). It plays a pivotal role in learning and recalling. It determines how new information is and how the links between pieces of information are. Individuals can understand a new piece of information only if they have a pre-acquired piece of information related to it (Driscoll, 1993 as cited in Uçak & Güzeldere, 2006). Cognitive structures of students reveal what they know and do not know about a given subject. Therefore, the present study made an attempt to analyze the cognitive structures of prospective students about the subject "force and motion".

Word association tests can be effectively used for determining misconceptions. Misconceptions are non-scientific information learned as a result of personal experiences and are an obstacle to teaching and learning scientific concepts (Çakır & Yürük, 1999). They provide reliable information as to the deficiencies in the theoretical knowledge of students. Among the reasons for misconceptions are wrong explanations, wrong questions or overgeneralizations (Yağbasan & Gülçiçek, 2003). They can be discovered through such techniques as interviews, multiple-choice tests, open-ended questions, concept maps and word association tests (Schmidt, 1997 as cited in Selvi & Yakışan, 2004). The study employed the word association test to find out the misconceptions of prospective teachers about the concepts included in the subject "force and motion".

A review of literature suggests that word association tests increase student achievement, enable their cognitive structures to get revealed and developed and disclose their misconceptions (Aydın, 2009; Bahar & Özatlı, 2003; Cardellini & Bahar, 2000; Ercan, Taşdere, & Ercan 2010; Kostova & Radoynovska, 2008; Kempa & Nicholls, 1983; Mayer & Greeno, 1972; Nakiboğlu, 2008; Roger et al., 1989; Smith & Mark, 1999 as cited in Spiteri, 2002; Shavelson, 1972; Timur, 2011). In the present study, unlike previous ones, the authors studied the cognitive structures of prospective preschool teachers concerning the subject "force and motion" and attempted to discover their misconceptions. Hopefully, the present paper will make a contribution to the literature. The reason why the subject "force and motion" was selected for the study is that students and prospective teachers find it relatively more difficult and there are identified misconceptions about it (Atasoy & Akdeniz, 2007; Demir, Uzoğlu, & Büyükkasap, 2012; Demirci, 2004; Eryılmaz, 2002; Eryılmaz & Tatlı, 2000; Turgut, Gürbüz, & Turgut, 2011; Yıldız & Büyükkasap, 2006; Zeybek, 2007). For instance, in a study on a total of 154 fourth grade prospective teachers who studied Classroom Teaching at Gazi University, Zeybek (2007) concluded that prospective teachers have misconceptions about the subject "force and motion". Similarly, Bahar and Polat (2007) conducted a study on 300 first grade high school students and 18 science and technology teachers. They discovered that it is physics-related subjects that are found most difficult by teachers and students alike.

The Purpose of the Study

The purpose of this study is to identify the cognitive structures of prospective preschool teachers and their misconceptions about the subject "force and motion" through the word association test.

Method

This study included the word association test to identify the cognitive structures of prospective preschool teachers and their misconceptions about the subject "force and motion". A "conceptual network" was formed on the basis of the quantitative data obtained through the word association test.

Population

The study was conducted on a total of 56 (52 female and 4 male) third grade prospective teachers who studied Preschool Teaching at Canakkale Onsekiz Mart University during the educational year 2011-2012. The participants answered the questions included in the WAT on a volunteer basis.

Data Collection Tool

In the study, the authors used the WAT as a data collection tool. A total of 10 key concepts were chosen from the subject "Force and Motion" and incorporated into the WAT. These key concepts were important to the subject, represented the essence of the matter and needed to be acquired by the prospective teachers. They were in accordance with the level of the prospective preschool teachers. To ensure this, learned opinion was received from 5 lecturers who specialize in and teach "Science Education", a course included in the fifth-term curriculum for preschool teaching. The WAT was arranged in a booklet. The first page included a section in which the participants were asked to fill in their personal information. The second page provided an explanation for the implementation of the test and a sample implementation. A key concept was written on the upper part of each page in the middle. The remaining part of each page included a 10-lines space in which the participants were expected to write down the concepts they associated with the key concept. The key concept was written at the beginning of each line of the 10-lines space. One page was allocated for each key concept. Below is a sample page layout for the implementation.

Velocity ----------
Velocity ----------
Velocity ----------
Velocity ----------
Velocity ----------
Velocity ----------
Velocity ----------
Velocity ----------
Velocity ----------
Velocity ----------
Related Sentence ----------

The key concepts included in the study were *Acceleration, Frictional Force, Gravitational Force, Balanced Force, Velocity, Weight, Mass, Force, Work and Power*. During the implementation, the participants were provided with necessary explanation. They were given 30 seconds for each word, which is in parallel with similar studies (Bahar, Johnstone, & Sutcliffe, 1999; Batting & Montague, 1959 as cited in Spiteri, 2002; Roger et al., 1989). The prospective teachers wrote down the words they associated with the given key concepts within the allocated time. Each key concept was written at the beginning of each line in order to minimize the risk of chain answering. In chain answering, participants do not return to the key concept for each line and they associate their own answer in the preceding line rather than the actual key concept, which harms the reliability of a test (Bahar & Özatlı, 2003). Great care was taken to allocate equal amount of time to each participant. After the time allocated for a key concept had been over, all the participants proceeded to the next one together. The sample implementation had been discussed beforehand and the participants had been made familiar with it. Therefore, no problem was experienced during the actual implementation. Participants were also expected to write down a sentence related to the key concepts. These sentences were individually examined during data analysis to decide whether they were scientific and whether they included any misconceptions.

Data Analysis

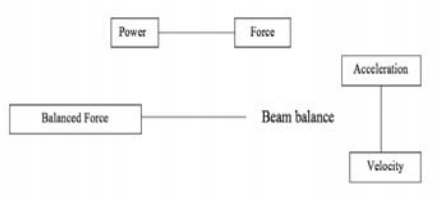
The answers provided by each prospective teacher were analyzed following the implementation and then a frequency table was drawn. On the basis of the frequency table, a conceptual network was formed to see in an easier way which words were associated with the key words. The conceptual network was designed through the technique "cut-off point", which had been proposed by Bahar et al. (2006). In this technique, one identifies the word that is most frequently repeated in the frequency table, formed on the basis of the answers to the key concepts. Afterwards, somewhere between 3 and 5 scores below this word is considered as the cut-off point. The answers at or above the cut-off point are written in the first part of the conceptual network. Next, an attempt is made to determine which words are associated with the key concepts. To do this, one has to go down certain number of scores below the point. The present study used "5" as the cut-off point.

Findings

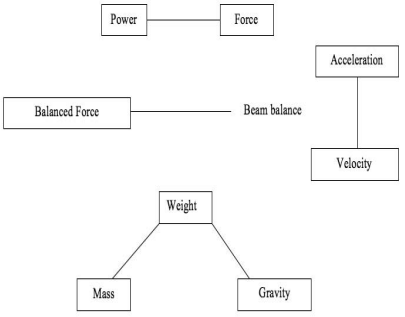
In accordance with the data obtained through the WAT, the answers provided by each prospective teacher to the key concepts were determined one by one. Appendix 1 presents the frequency of the total number of words associated by the prospective teachers with these concepts.

The conceptual network formed on the basis of the frequency values and subsequent comments are as follows:

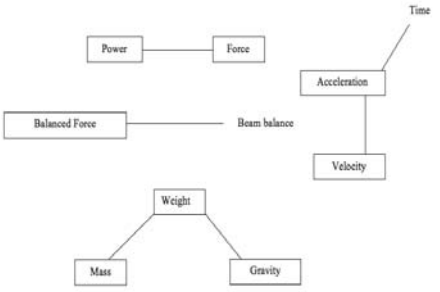
For the Cut-Off Point 35 and over (37)



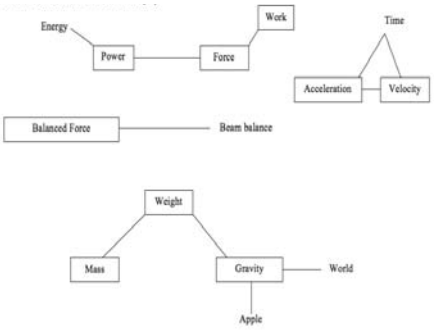
For the Cut-Off Point 30 and over (34)



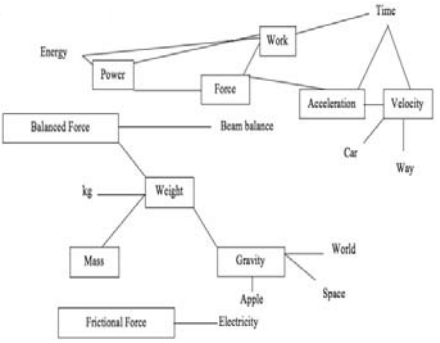
For the Cut-Off Point 25 and over (29)



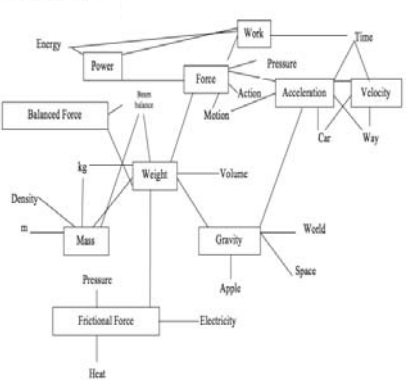
For the Cut-Off Point 20 and over (24)



For the Cut-Off 15 to 19



For the Cut-Off Point 10 to 14



For the Cut-Off Point 5 to 9

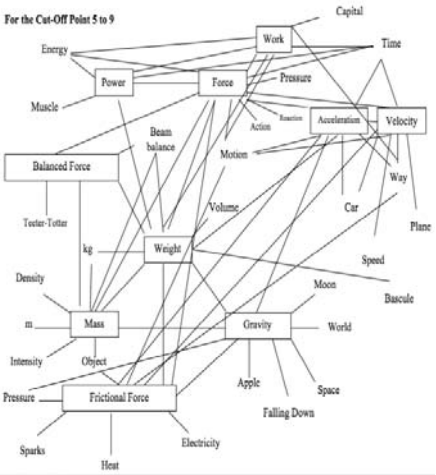


Figure 1. *The Conceptual Network Formed on the Basis of the Key Concepts*

Figure 1 can be interpreted as follows;

1. For the cut-off point 35 and over, there was a double relationship between only four of the ten key concepts. These associated concepts are often used interchangeably in daily life and connote one another (Power-Force, Acceleration-Velocity). In addition, the first thing that sprang to minds when the participants thought "balanced force" was beam balance. The reason for this might be that a beam balance has two parts that try to balance each other.
2. For the cut-off point 30 and over, the number of concepts associated increased. Even so, it was a slight increase. Furthermore, the concepts associated are often used in daily life (Mass-Weight-Gravity). The reason why these concepts were associated might be that the participants thought that weight is a result of gravitational effect on a mass.
3. For the cut-off point 25 and over, just one new concept was associated. The prospective teachers associated the key concept "acceleration" with time. At this point, as was the case for the previous ones, the participants were not able to associate the concepts Power-Force, Balanced Force-Beam Balance, Mass-Weight-Gravity with other concepts, which caused these concepts to appear like "islets" on the page.
4. For the cut-off point 20 and over, nine key concepts appeared. The key concept "force" was associated with another key concept "work". Furthermore, the relationship between acceleration and time turned into a conceptual network among acceleration, time and velocity. Besides, the key concept gravity was associated with the words "world" and "apple". The associations suggest that the participants remembered the definitions of and mathematical formula for the key concepts. For instance, acceleration was associated with velocity and time on the basis of its definition and formula. Similarly, work was associated with force, for work is what happens when some force is exerted on an object to make it move. An interesting finding is that gravity was associated with apple, the object that enabled Newton to realize what gravity is.
5. For the cut-off point 15 and over, the participants were gradually able to associate the key concepts with each other. The triangles "work-power-force" and "work-power-energy" appeared at this point. In addition, the key concepts weight and balanced force were associated with each other while the concepts weight and kg were associated with one another. The association between weight and kg resulted from the idea of the participants that kg is a unit for measuring weight. Since weight and kg are used interchangeably in daily life, this leads to one of the most striking misconceptions in science education. Finally, the participants associated the key concept frictional force with electricity, which signals another misconception on the part of the prospective teachers.
6. For the cut-off point 10 and over, the prospective teachers were able to associate slightly more key concepts with one another. The key concept weight was associated with two other key concepts, namely frictional force and force. Another interesting association was between the key concept "mass" and the concept "kg", which might have resulted from the fact that the unit for measuring mass is kg. Another concept that appeared at this cut-off point was motion. It was associated with the key concepts acceleration and force. The reason why motion was associated with force is the idea of the participants that objects move thro-

ugh force. Besides, the reason why the participants associated motion with acceleration is their idea that acceleration is the change in velocity and that an object with its own velocity could be moving.

7. For the cut-off point 5 and over, the participants were able to associate most of the key concepts with each other and with a number of new words, which brought about some misconceptions. For instance, work was associated with capital whereas velocity was associated with speed. Although these concepts can be used interchangeably in daily life, they are actually physical misconceptions. Physically, work has nothing to do with capital. Although velocity and speed might connote each other, they are different concepts. Velocity is a vector quantity while speed is a scalar quantity.

After the conceptual network had been formed, an analysis was made of the sentences the participants built up related to the key concepts. The sentences were grouped under three categories proposed by Ercan et al. (2010), namely sentences *with scientific information, sentences with non-scientific or superficial information and sentences with misconceptions.* The sentences that included a scientific statement related to the key concept fell into the first category. Examples include *"The weight of an object depends on the gravitational force", "If we move a table, we are involved in a work", "When you buy fruits, their mass is measured", and "The reason why bobo doll does not collapse is balanced force"*. The sentences that included daily-life hearsay fell into the second category. Examples include "*We must have a good work", "Power over, work over", "Time goes by fast", "Our work is to study", "Uncontrolled power is not power" and "You can achieve anything with power"*. The sentences with information that is thought scientific but actually means something different fell into the third category. *"Kg is the unit of weight". "The apples weighed 2 kg", "Weight affects power" and "There is no gravitational force in the space"*.

Table 1.
The Frequency Table of the Sentences Built up by the Prospective Teachers related to the Key Concepts

Key Concepts	The number of sentences with scientific information	The number of sentences with non-scientific or superficial information	The number of sentences with misconceptions
Acceleration	5	18	7
Frictional Force	16	16	3
Gravitational Force	26	6	3
Balanced Force	17	6	1
Velocity	7	21	4
Weight	13	13	6
Mass	17	14	2
Force	7	20	-
Work	2	22	5
Power	1	27	3

Most of the sentences built up by the prospective teachers related to the key concepts fell into the category of *sentences with non-scientific or superficial information* (Table 1). They were able to build up higher number of sentences with scientific information by using the key concepts gravitational force and balanced force. This might have resulted from the fact that they have fewer misconceptions about these concepts and they are involved in practices with these concepts in their daily life. The sentences related to the key concepts acceleration, velocity and weight included more misconceptions than the others. The reason for this might be that acceleration is a concept that is rarely used in daily life and other scientific concepts are used instead of it. The reason why the participants had misconceptions about weight is that the concept is associated with kilogram in daily life. This misconception was reflected on the sentences they built up. Similarly, the reason for their misconceptions about velocity is that they confuse it with speed and use the former to mean the latter in their daily life. Nevertheless, velocity is a vector, i.e. directional, concept whereas speed is a scalar, i.e. non-directional, concept.

Conclusion and discussion

The purpose of this study is to identify the cognitive structures of prospective teachers concerning the subject "Force and Motion". Unlike previous ones, the present study included the word asso-

ciation test to reveal the cognitive structures of prospective preschool teachers. The participants were able to accurately associate the key concepts regarding "force and motion" with one another and other scientific concepts. Examples of such concepts include force-work and mass-weight. Even so, some misconceptions were identified about force and motion. They resulted from the way they used and gave meaning to the concepts. The word association method is important in that it can show the organization of the concepts included in the subject "force and motion". The concepts power, force, velocity, acceleration, balanced force and beam balance stood out in the test. The prospective teachers associated these concepts more often than others. However, frictional force and balanced force were less frequently associated. For instance, the participants associated velocity with speed, although they are different from each other. This finding is supported by that of Yıldız, Büyükkasap, Erkol, and Dikel (2007), who studied prospective science teachers.

The study concluded that the WAT plays a key role in revealing the cognitive structures of students. The findings of the present study are in parallel with those in the literature. For instance, Bahar and Özatlı (2003) used the word association test in their study on the cognitive structures of first grade high school students concerning "the basic components of living creatures". The students' preliminary information covered so much irrelevant ground in the WAT used as a pretest whereas they provided a higher number of and more scientific answers in the WAT used as a posttest. Similarly, Ercan et al. (2010) conducted a study on 31 seventh grade students. They used the word association test as a pretest and posttest. The tests included six key concepts included in the unit "solar system and beyond: space puzzle". After the two-week training, the students' conceptual change was positive and their misconceptions were identified.

The participants had difficulty in associating the concept "acceleration". The reason for this might be that it is not commonly used in their daily life. Since acceleration means a change in velocity in time, velocity is much more commonly used. Another conclusion is that the prospective teachers could write down a number of sentences that included scientific information related to the concepts "gravitational force", "balanced force" and "mass". These concepts are used quite commonly. For example, gravitational force is taught at each educational stage starting from primary school. Furthermore, its existence can be proven quite easily. An object falls down when dropped. In this way, concepts that are used commonly in daily life are more likely to be comprehended in a proper way and less likely to be confused with other concepts. The students had fewer misconceptions about concepts with which they had been able to build up sentences with scientific information. On the other hand, the sentences that the participants built up related to the concept "acceleration", a concept not commonly used in daily life, included the highest number of misconceptions. The more abstract scientific concepts are made and the more they are associated with daily life, the more permanent learning individuals will experience and the fewer misconceptions they will have.

The prospective teachers had difficulty in writing statements on certain concepts. As for the concepts they could not fully internalize, they wrote down sentences with either misconceptions or superficial information. Examples of sentences with misconceptions include *"Kg is the unit of weight". "The apples weighed 2 kg", "Weight affects power" and "There is no gravitational force in the space"*. On the other hand, examples of sentences with superficial information include "*We must have a good work", "Power over, work over", "Time goes by fast", "Our work is to study", "Uncontrolled power is not power" and "You can achieve anything with power"*.

Suggestions

The following recommendations can be made on the basis of findings:

- The study concluded that prospective teachers confuse the key concepts regarding the subject "force and motion" and other scientific concepts. Such techniques as conceptual networks, diagnostic trees and concept maps can be used to prevent them from getting confused about scientific concepts.
- Prospective teachers have misconceptions about some concepts related to the subject "force and motion". Misconceptions can be prevented and overcome through the kind of practical activities in which current examples are given from daily life. Furthermore, it is recommended that the method of analogy should be used to understand the relationships between concepts in a better way.
- Similar studies could be conducted on other subjects in accordance with the level of prescho-

ol teaching and prospective preschool teachers in order to lay the foundation for effective education.

- The word association test can also be used in other areas to identify the cognitive structures of prospective teachers. In addition, it can be used as a pretest or posttest to test the efficiency of a teaching method.
- Studies can be conducted to overcome the misconceptions identified through the word association test.
- Prospective teachers should be informed about how to use word association tests and how to interpret the results.

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Appendix

The Frequency Table Used to Form the Conceptual Network

	Acceleration	Frictional Force	Gravitational Force	Balanced Force	Velocity	Weight	Mass	Force	Work	Power
Acceleration	X	9	5	1	10	1	2	7	-	-
Frictional Force	1	X	-	-	1	-	-	3	-	-
Gravitational Force	14	6	X	3	4	10	8	4	-	2
Balanced Force	-	-	1	X	-	-	1	2	-	-
Velocity	35	9	4	1	X	-	1	6	4	2
Weight	5	13	30	18	1	X	30	10	5	7
Mass	3	2	7	5	1	17	X	6	1	-
Force	18	9	4	8	4	1	4	X	22	37
Work	-	1	-	-	-	-	-	6	X	18
Power	3	1	1	1	-	1	-	32	19	X
Electricity	1	16	-	-	-	-	-	-	-	3
Apple	-	-	24	-	-	-	1	-	-	-
Space	-	-	18	1	-	3	3	-	1	-
Newton	1	-	30	-	-	1	1	2	-	-
Beam balance	1	-	1	36	-	10	12	1	-	-
Volume	1	-	2	2	-	11	30	-	-	-
Muscle	-	-	-	-	-	-	-	3	-	7
Energy	-	2	1	-	-	-	-	6	15	21
Action	-	3	-	1	-	-	-	11	-	4
Reaction	1	-	-	1	-	-	-	9	1	2
Car	10	2	1	-	19	-	-	-	-	1
World	-	-	21	-	-	4	1	-	-	-
Speed	-	-	-	-	6	-	-	-	-	-
Motion	13	5	1	-	6	-	-	10	7	4
Time	28	-	2	-	23	-	-	5	18	9
Kg	-	-	1	2	-	19	11	-	-	-
Teeter-totter	-	-	-	8	-	-	-	-	1	-
m	-	-	-	-	-	-	11	-	-	-
Falling down	3	1	7	1	1	-	-	-	-	-
Moon	-	-	9	-	-	4	1	-	-	-
Object	-	5	-	2	-	-	6	1	-	-
Way	13	5	1	1	15	-	-	3	5	-
Weighing Machine	-	-	-	1	-	5	-	-	-	-
Intensity	-	-	-	-	-	3	7	-	1	1
Heat	-	12	-	-	-	-	-	-	-	1
Density	1	-	1	-	-	1	13	-	-	-
Capital	-	-	-	-	-	-	-	-	7	2
Plane	1	1	1	-	6	-	-	-	-	-
Pressure	-	13	5	-	-	1	4	11	1	2